and *g*, without its being so stated, is taken in *inches* per second per second.

A chapter headed "Testing of Electric Light Dynamos, Accumulators, and Transmission of Power," given at pp. 176-86, is not at all satisfactory. The tests for the efficiency of a secondary battery are neither clearly nor fully given, and the score of lines devoted to this important subject close with a most remarkable sentence, which we quote :—"The total work done in charging and discharging may also be measured by a suitable voltameter joined up as a shunt to the secondary battery, so as to pass a known fraction of a current through it."

At p. 373 there are two or three misprinted formulas, but in the first line of p. 374 we have perhaps the most extraordinary equation ever given in a work on electrodynamics. The difference of potential at the terminals of a dynamo (a shunt-dynamo we presume is meant) is there stated to be equal alternatively to the product of the current in the field magnets multiplied into their resistance, to the current in the external circuit multiplied into the resistance of the external circuit, and *to the current in the armature multiplied into the resistance of the armature!*

The calculation (p. 345) relative to the electrolytic decomposition of copper sulphate involves also serious theoretical errors. Mr. Jamieson, multiplying together the electro-chemical equivalent of copper and the heat of combination of copper and oxygen, makes the "electromotive force required to deposit copper from a solution of sulphate of copper" to be ·836 volt. In the particular case, not however referred to, of a cell having a platinum anode and copper kathode, this would be the approximate electromotive force required on the cell to produce electrolysis. But the author actually goes on to use this result as the electromotive force required on an ordinary electro-plating bath to effect the electrolysis, and bases on it some conclusions as to the efficiency of a Siemens machine depositing copper in commercial work, or in the stereotyping of ordinary printed matter. In these cases of course both anode and kathode are copper plates, and the calculated electromotive force has no application whatever.

A single remark on another subject we would make before taking leave of this work. In many places where the compilers are under obligations to other authors due acknowledgment is wanting. For examples we may refer to several parts of the chapter on submarine telegraphy, to pp. 369-76 on dynamos and transmission of power, and to part of p. 403, where, by the way, the very serious errors inherent in the method of determining (?) the intensity of a magnetic field by counting the oscillations of a magnetic needle are not alluded to.

In conclusion we have no hesitation in saying that with a careful weeding of the tables, minute verification and correction of the algebraical work, deletion of a good deal of the "theory" given, and lastly, copious references to original sources, both as a matter of convenience to the user and of literary justice, this "Pocket-Book" will be made a very valuable *vade mecum* for electrical engineers. As it is, it will no doubt be found of service, but, as we have indicated, its statements must on several subjects be received with caution. A. GRAY

The Non-Bacillar Nature of Abrus Poison. By C. J. H. Warden, Surgeon I.M.S., and L. A. Waddell, Surgeon I.M.S. (Calcutta, 1884.)

THIS pamphlet is an exhaustive treatise on the nature, physiological and chemical properties of the seeds of *Abrus precatorius*, called Jequirity by the South Americans, and used to cure granular lids. As is now well known through de Wecker of Paris and Prof. Sattler, this popular remedy of the South Americans produces, when used as an infusion and applied to the conjunctiva, severe ophthalmia, in the course of which granular lid (trachoma) is brought to cure. In India it is used by the natives for subcutaneous injection into cattle, wherewith to produce a kind of septicæmia and death. The nature of the poison has been thought by de Wecker and Sattler, and later by MM. Cornil and Berlioz, to be due to a bacillus (the Jequirity bacillus), the spores of which are derived from the air; and, although harmless at first, assume pathogenic properties when grown in an infusion of the Abrus seeds. It has been conclusively proved, however, that this is not the case, that the active principle of the Abrus seeds is present before any contamination with the bacillus could have taken place, and further, that the Jequirity bacillus, when freed from the infusion, possesses no power of producing ophthalmia.

Messrs. Warden and Waddell have carefully examined the chemical nature of the seeds, and they find that the active principle, abrin, is a proteid, closely allied to native albumen, and obtainable not only from the seeds, but also from the root and stem. E. K.

A Text-Book of Pathological Anatomy and Pathogenesis. By Ernst Ziegler. Translated and edited for English students by Donald Macalister, M.A., M.B., &c. Part II. Special Pathological Anatomy, Sections I.-VIII. (London: Macmillan and Co., 1884.)

THE enormous success that has attended the first part of this work will, we feel sure, in no way abate with the present volume. Like its predecessor it is a masterly exposition of all that is known concerning the pathological anatomy of the parts treated. In this last volume the special pathological anatomy of the blood and lymph, the vascular mechanism, the spleen and lymphatic glands, the serous membranes, the skin, the mucous membranes, the alimentary tract, the liver and pancreas, are described with great clearness and thoroughness. The subjects are treated in a detailed and systematic way, without incumbrance with self-understood details. The illustrations are very admirable, and while not profuse, are nevertheless thoroughly representative. The bibliography, particularly of the more recent works, is, in the English edition, thanks to Dr. Macalister, a most valuable improvement on that in the German edition. While a help to the learner, it will no doubt prove also a valuable companion to the teacher. E. K.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*

[*The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.*]

The Late M. Dumas

I HAVE received from M. Pasteur, President of the Committee, a letter informing me that it is proposed to erect a statue to the memory of Dumas at Alais, his native town. The name of Dumas is so prominent in the history of our science that no words of mine are needed in support of such a proposition, and I merely express the hope that many English chemists will be willing to contribute to this memorial. Subscriptions will be received by the secretaries of the Chemical Society, Burlington House, Piccadilly. W. H. PERKIN, P.C.S.

The Cholera Germ

THE latest enunciations of Prof. Koch from Toulon and Marseilles concerning the relation of his "comma-shaped" bacillus to cholera are so contradictory, that it is worth while to take notice of them.

Koch, as was mentioned in your last issue (p. 237), maintains that the "comma-shaped" bacillus is the cause of cholera; and

finding it in the alimentary canal only, but not in the blood and tissues, of persons affected with cholera, he is necessarily forced to assume that the alimentary canal is the exclusive organ into which the cholera poison enters and in which it has its breeding ground. On the other hand, Koch has ascertained that the "comma-shaped" bacillus is fatally affected by acid. This result, having been established by direct experiment, is naturally perfectly trustworthy, and is, besides, in complete harmony with what is known of other bacilli, both pathogenic and non-pathogenic, which, as is well established, succumb to the influence of acid.

Now, these three propositions, (1) that the "comma-shaped" bacillus is the cause of the cholera, (2) that the alimentary canal is the exclusive organ of entrance of the cholera virus, and (3) that the "comma-shaped" bacillus is neutralised and killed by acid, appear to me to be in hopeless contradiction.

The first two propositions are assumptions, the third is based on direct experiment, and is, as just stated, perfectly in harmony with other observations. If, then, this third proposition be true, the other two cannot be true, that is to say, if it is true—and there can be no doubt about it—that the "comma-shaped" bacillus succumbs to the action of acid, then it cannot be true that the "comma-shaped" bacillus is the cholera virus, nor that the alimentary canal is the sole entrance of the cholera virus. How, we may ask, can the "comma-shaped" bacillus pass unscathed the acid contents and the acid secretion of the stomach? To maintain, as Koch is reported to have done, that in all persons attacked by cholera the stomach must have been previously so deranged that its contents and secretions are not acid must appear to every one who has had any experience during a cholera epidemic an untenable proposition. On the one hand, it is known that such a serious disorder of the gastric mucous membrane as the total absence of acidity is of comparatively rare occurrence, while, on the other, in every cholera epidemic numbers of persons become affected with the disease in whom such a gastric condition, antecedent to the infection, can with certainty be excluded. E. K.

The Mountain System of the Malayan Peninsula

SOME new facts with regard to the mountain system of the Malayan peninsula may be of interest to many of your readers. In exploring through the native State of Perak I find that, in addition to the main range, which occupies about the centre of the territory and runs in a north and south direction, there are two other ranges belonging to quite different systems, and, as I think, of different geological age. The first is close to the coast. It is a series of ridges parallel to each other, but detached, having a north-north-east or south-south-west trend. These ridges are of granite, and rise to a considerable height, such as Gunong (Malay for mountain) Inas, over 5000 feet; Titi Wangsu, nearly 7000 feet; Gunong Hijau, 4400 feet, and Gunong Bubu, or Bubor, 5600 feet. The two latter I have ascended. Though they are detached from each other, they form a watershed between the coast and the inland drainage, and thus the River Perak has to drain an immense valley in a north and south direction until it finds an outlet to the south of the Dindings.

To the east of the Perak there is a small range about twenty-five miles long, perfectly detached from the other systems, and having generally a north and south direction, but sending off spurs a little west of south. This also is granite, but on its lower shoulders has thick deposits of stratified limestone, above and below which tin is worked. To the north this range is bounded by the valley of the River Plus, which here joins the Perak, and to the south by the mouth of the Kiuta. The latter river runs in a valley to the east of this range, and where it ceases joins the Perak. To the east of the Kiuta again comes the main range with many peaks over 7000 feet high; Gunong Riam probably reaching over 8000 feet.

The first series of ranges have their origin in the State of Keddah, just where the Malayan peninsula begins to widen out. This widening out is entirely due to this mountain system. The island of Penang is a part of it, and so are the islands called the Dinding Group. Were the coast to subside about 300 feet, we should have a narrow peninsula fronted by a series of large and very elevated granite islands having their longest diameter north-north-east and south-south-west. The second mountain chain has a different direction, and nowhere rises above 3000 feet; but both ranges are rich in tin. The first series has at its base Palæozoic schists, slates, and clays. The second has limestone. The Palæozoic rocks are rich in tin at the junction with the granite. The tin in the second range lies above and below the limestone, and has been derived from the older formation. The Palæozoic clays resemble very closely the gold-bearing slates and schists of Australia. To the south they are nearly denuded away, but in Lower Siam, from specimens I have seen, they are full of auriferous quartz reefs.

It is singular that in this mountain system we have the closest resemblance to the tin-bearing districts of north-eastern Australia. When exploring geologically the Wilde River district in 1881 and the Daintree River in 1879, I found that the sources of the tin were in detached granite mountains or groups of mountains—granite islands, so to speak, much higher than the present watershed of the country, but, being detached from each other, allowed the rivers to pass round and between them. I have referred to the same thing in Tasmania in my account of the physical geology of that country. Geologists in England can say if there is any resemblance to this state of things in the tin-bearing granites of Cornwall. I am inclined to think that we have in these rocks the remains of a former and very ancient mountain system.

I may add that it is a pity that we still find in recent books of high authority the statement reiterated that the highest mountain on the Malayan peninsula is Mount Ophir, near Malacca (4360 feet). Here are the heights of a few in Perak:—Slim Mountains, 6000 or 7000 feet; Titi Wangsu, 6900 feet; Riam, 8000 feet at least; Hijau, 4400 feet; Bubor, 5630 feet; Gunong Rampip, 7800 feet; Gunong Rajah, 6500 feet; besides many others in Reman and Pahang which have not been explored.

Arang Para, Perak, June 2 J. E. TENISON-WOODS

Chalk and the "Origin and Distribution of Deep-Sea Deposits"

IN consequence of Dr. Gwyn Jeffreys' letter, I feel it incumbent, in the interests of geology, to restate the position with regard to the question of the depth of the ocean in which the White Chalk of England was deposited. The cause that led to its deposition over a former land surface was indubitably a great though gradual depression of that area. The process commenced with the Neocomian age, when two seas encroached from north and south, until they were probably only separated by some relatively unimportant ridges or islands to the north of London. The depression seems to have been checked for a long period, but recommenced in the Gault age in a more serious manner. Now, according to Renard and Murray, the *Blue Mud*, with which I assume the Gault is to be identified, if with anything, is formed around shores and in partially inclosed seas, passing into a true deep-sea deposit at a distance from land. The limits of depth at which *Blue Mud* is formed are not stated, but the Mollusca of the Gault, if not indicating a very great depth, are quite against its being a very shallow-water formation. There are several deep-water genera, such as *Neœra*, *Leda*, *Limopsis*, *Cadulus*, *Dentalium*, *Eulima*, in it, and I believe that when the smaller Mollusca from it have been reinvestigated by the light of our present knowledge, a far greater similarity between them and deep-water forms will be apparent. The Gault also contains a very large number of Foraminifera and several Encrinites and other Echinoderms, which are not, I believe, characteristic of long-shore deposits; while there is a remarkable absence in it of the more distinctly shallow-water shells that abound in the Neocomian, and it has none of the coarser fragments of rock, 2 cm. in diameter, which are stated in Renard and Murray's paper to occur in the near-shore muds. We must assume a considerable depth of water for the Lower Gault—what depth I would be well pleased to leave to Dr. Gwyn Jeffreys to say. Now, if there is one fact more apparent than another, it is that the Upper Gault represents a deeper sea than the Lower, and therefore that the depression was maintained. The *Blue Mud* is replaced in neighbouring areas by *Green Muds and Sands* with Glauconitic grains which apparently are deposited in similar depths or situations; but the limit of depth at